

UNITED STATES PATENT AND TRADEMARK OFFICE  
**CERTIFICATE OF CORRECTION**

PATENT NO. : 6,955,857 B2  
DATED : October 18, 2005  
INVENTOR(S) : Yukiko Kubota, Dieter Weller and Mei-Ling Wu

Page 1 of 4

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Drawing sheets 1 of 2 and 2 of 2 should be replaced with attached.

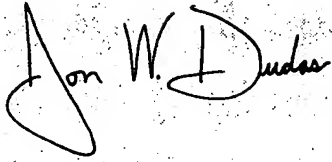
Column 4,

Line 44, after "magnetic", insert -- recording --.

Line 47, change "palladium" to -- platinum --.

Signed and Sealed this

Fourteenth Day of February, 2006

A handwritten signature in black ink, reading "Jon W. Dudas". The signature is stylized, with a large loop for the "J" and a cursive "Dudas". It is positioned over a faint, rectangular, dotted background.

JON W. DUDAS

*Director of the United States Patent and Trademark Office*

(12) **United States Patent**  
Kubota et al.

(10) Patent No.: **US 6,955,857 B2**  
(45) Date of Patent: **Oct. 18, 2005**

(54) **EXCHANGE DECOUPLED COBALT/NOBLE METAL PERPENDICULAR RECORDING MEDIA**

(75) Inventors: Yukiko Kubota, Pittsburgh, PA (US);  
Dieter Weller, Gibsonia, PA (US);  
Mel-Ling Wu, Cranberry Township, PA (US)

(73) Assignee: Seagate Technology LLC, Scotts Valley, CA (US)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 98 days.

(21) Appl. No.: 10/032,721

(22) Filed: Dec. 27, 2001

(65) **Prior Publication Data**

US 2002/0086184 A1 Jul. 4, 2002

**Related U.S. Application Data**

(60) Provisional application No. 60/258,790, filed on Dec. 29, 2000.

(51) Int. Cl.<sup>7</sup> ..... G11B 5/673

(52) U.S. Cl. .... 428/694 TS; 428/694 TM

(58) Field of Search ..... 428/694 TS, 694 TM, 428/611, 669, 670, 678, 215, 336

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

4,103,315 A 7/1978 Hempstead et al.  
4,210,946 A 7/1980 Iwasaki et al.  
5,051,288 A 9/1991 Ahlert et al.  
5,587,235 A \* 12/1996 Suzuki et al. .... 428/332  
5,604,030 A \* 2/1997 Yamane et al. .... 428/332  
5,726,838 A \* 3/1998 Soeya et al. .... 360/327.32  
5,750,270 A \* 5/1998 Tang et al. .... 428/611  
5,834,085 A 11/1998 Lairson et al.  
6,139,950 A 10/2000 Wu et al.  
6,156,422 A 12/2000 Wu et al.

6,207,269 B1 3/2001 Wu et al.  
6,212,047 B1 4/2001 Payne et al.  
6,218,003 B1 4/2001 Wu et al.  
6,221,481 B1 4/2001 Wu et al.  
6,238,780 B1 5/2001 Wu et al.  
6,238,809 B1 5/2001 Wu et al.  
6,280,813 B1 8/2001 Carey et al.  
6,468,670 B1 \* 10/2002 Ikeda et al. .... 428/611  
2001/0051287 A1 \* 12/2001 Kikitsu et al. .... 428/694 ML  
2002/0192506 A1 \* 12/2002 Coffey et al. .... 428/694 TM

**OTHER PUBLICATIONS**

L. Wu et al., "Medium noise properties of Co/Pd multilayer films for perpendicular magnetic recording", *Journal of Magnetism and Magnetic Materials* 193; (1999) pp. 89-92; Publisher—Elsevier; JAPAN.

Y. Ochiai et al.; "Co/Pt and Co/Pd Ultrathin Multilayered Films as New Magneto-Optical Recording Materials"; *IEEE Transactions on Magnetism*, vol. 25, No. 5, p. 3755-3757; Sep. 1989; JAPAN.

P.F. Garcia; "Perpendicular magnetic anisotropy in Pd/Co and Pt/Co thin-film layered structures" *Journal of Applied Physics*, vol. 63, No. 10, p. 5066-5073, May 15, 1988; American Institute of Physics.

Takano et al.; "Co<sub>1-x</sub>Cr<sub>x</sub>/Pt multilayers as perpendicular recording media" *Journal of Applied Physics*, vol. 87, No. 9, p. 6364-6366, May 1, 2000, American Institute of Physics.

\* cited by examiner

Primary Examiner—Kevin M. Bernatz

(74) Attorney, Agent, or Firm—Buchanan Ingersoll PC; Dennis M. Carleton

(57) **ABSTRACT**

A magnetic recording medium of the perpendicular type, for a disc drive. The magnetic recording material includes a Cobalt alloy layer interspersed with a noble metal layer. The initial graded material is paramagnetic to increase to the magnetic properties of perpendicular recording media into increase the signal to noise ratio. The final recording layer has 8-20 alternating multilayer of the Cobalt alloy and a noble metal.

26 Claims, 2 Drawing Sheets

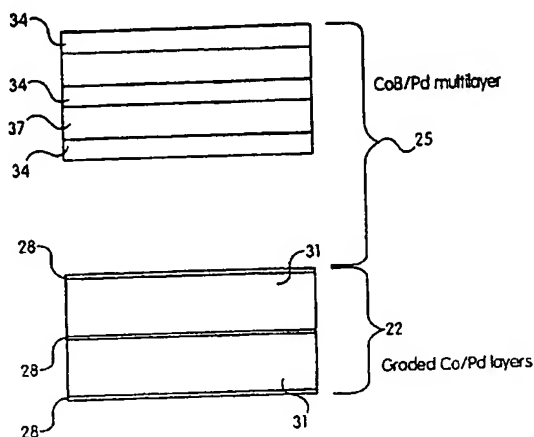


FIG. 1

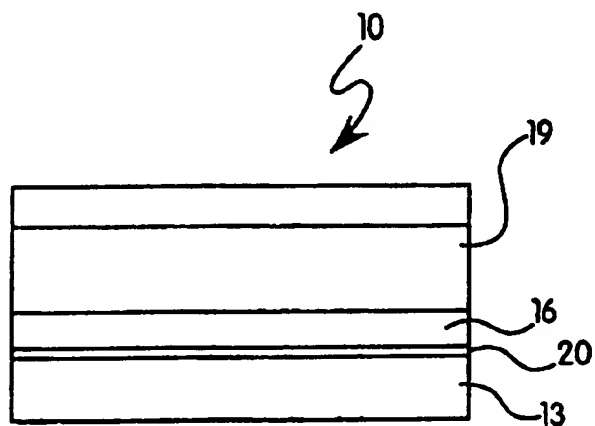
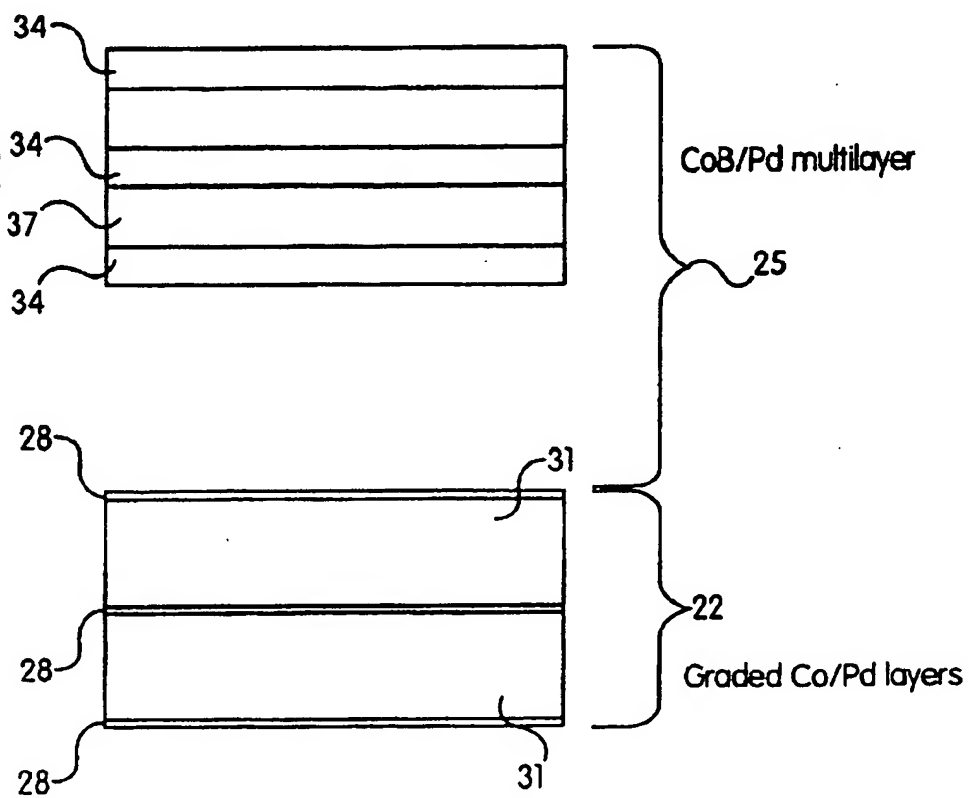


FIG. 2



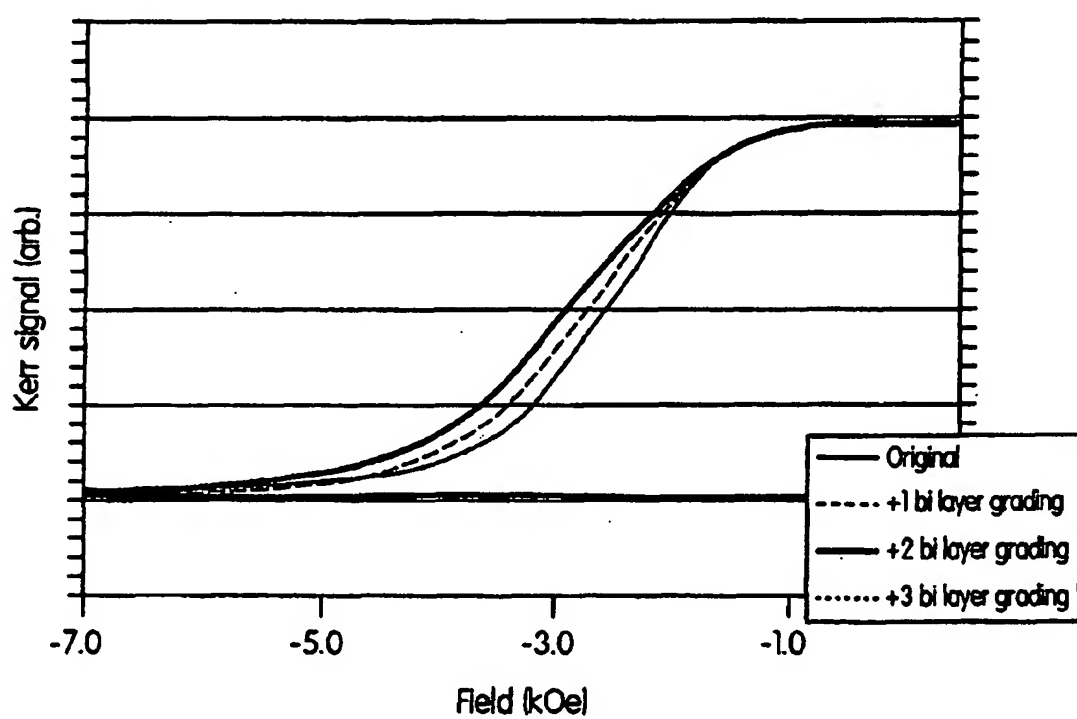


FIG. 3